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Potential germination of commercialized seeds and production of dalia seedlings in Varzea Grande, Mato Grosso, Brazil

Potencial germinativo de sementes comercializadas e produção de mudas de dália em Várzea Grande, Mato Grosso, Brasil

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ABSTRACT
There is little information on the cultivation of species with ornamental potential in Mato Grosso. The aim of this work was to evaluate, in Varzea Grande (MT), the favorable environment for the production of *Dahlia pinnata* Cav. and the quality of the seeds sold for this purpose. The experiment took place at the Seed Laboratory and at the experimental field of Varzea Grande University Center (Univag), Mato Grosso. Seeds of this species were purchased in commercial packaging. The seeded materials were arranged in the greenhouse with 50% shading (Sombrite®) and in full sun, both with daily irrigation. Growth assessment was performed from the seventh day after emergence. The number of emerged plants was evaluated from the first week after sowing until the establishment of seedlings.Analysis of variance was performed by Tukey test at 5% and regression analysis. The germination test showed 71% of normal seedlings, a lower value than the minimum germination described in the package, and emergence and establishment of 32% of the seedlings. The evaluated conditions, in greenhouse under 50% shading, were favorable to the production of *Dahlia pinnata*, even when commercial seeds presented low germination potential.
Keywords: *Dahlia pinnata*; floriculture; germination; ornamental.

RESUMO
Existem poucas informações sobre o cultivo de espécies com potencial ornamental em Mato Grosso. O objetivo deste trabalho foi avaliar, no município de Várzea Grande (MT), o ambiente favorável para a produção de mudas de *Dahlia pinnata* Cav. e a qualidade das sementes comercializadas para tal finalidade. O experimento ocorreu no Laboratório de Sementes e no campo experimental do Centro Universitário de Várzea Grande (Univag), Mato Grosso. Sementes da espécie em apreço foram adquiridas em embalagens comerciais. Os materiais semeados foram dispostos na casa de vegetação com 50% de sombreamento (Sombrite®) e em sol pleno, ambos com irrigação diária. A avaliação do crescimento ocorreu a partir do sétimo dia após a emergência. Avaliou-se o número de plantas emergidas, desde a primeira semana após a semeadura até o estabelecimento das mudas. Realizaram-se análise de variância pelo teste de Tukey a 5% e análise de regressão. O teste de germinação evidenciou 71% de plântulas normais, valor menor que a germinação mínima descrita na embalagem, e emergência e estabelecimento de 32% das mudas. As condições avaliadas, em casa de vegetação sob 50% de sombreamento, foram favoráveis à produção de *Dahlia pinnata*, mesmo quando as sementes comerciais apresentaram baixo potencial germinativo.
Palavras-chave: *Dahlia pinnata*; floricultura; germinação; ornamental.

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INTRODUCTION

The genus *Dahlia* belongs to the family Asteraceae, and is native from Mexico. It is a potentially attractive plant as ornamental and the two main species for this purpose are *Dahlia pinnata* Cav. and *Dahlia coccinea* Cav. (MARIÑA, 2015). These plants are herbaceous, rhizomatous, and can be found with different sizes from a height of 30 cm to 1.50 meter, with large and composed leaves, flowers of diverse sizes and colors and the *capitula* simple or double (STUMPF, 2016).

Asteraceae is one of the largest plant families among the Angiosperms, comprising about 25,000 species with 1,600 genera, being arranged in 17 tribes and three subfamilies. It is estimated that, in Brazil, the family includes approximately 196 genera and about 1,900 species (HATTORI & NAKAJIMA, 2008).

Asteraceae consists of representatives of herbaceous, sub-shrubs, shrubs, lianas and trees as habit. They have a cosmopolitan distribution, in varied climatic conditions, from tropical-subtropical to temperate regions (CANCELLI *et al.*, 2007).

The worldwide flower and ornamental plants trade has seen a huge increase over the years. The production of flowers and ornamental plants in Brazil has been following the expansion of the world´s market, which grows every year (LANDGRAF & PAIVA, 2009).

According to Porto *et al.* (2012), the flower production in Brazil can be developed in any region, but it is necessary to use specific technologies for each type of flower and climate.

According to Tomaz (2009), Mato Grosso has an ever evolving history of agriculture and flower production, upskilling the local populace to work in the productive chain and also to understand the cultivation of native plants, tropical flowers, foliage and ornamental plants.

Although this sector has improved, there are still some difficulties in the formation of seedlings due to the fact that the climate in Mato Grosso State is warm. These higher temperatures cause additional work and attention regarding the need for constant shading and irrigation.

There are few studies about dahlias in Brazil and especially in Mato Grosso on the species *Dahlia pinnata* Cav. The municipality of Varzea Grande, State of Mato Grosso, has an interest in developing the production of flower shoots of dahlia. In this way, it is necessary to evaluate the quality of the commercialized seeds and of the different cultivation environments, knowing that the climatic conditions are imperative for vegetation production.

MATERIAL AND METHODS

The experiment was carried out in the Laboratory of Seeds and in the experimental field of Centro Universitario de Varzea Grande (Univag), State of Mato Grosso.

Seeds of the species *Dahlia pinnata* Cav. were purchased in commercial, moisture-proof packaging, with labels indicating: brand, origin, lot number, date of analysis, percentage of purity, germination and shelf-life.

In the seed laboratory, the germination test was carried out for the initial evaluation of the germination potential of the seeds, using 200 seeds, subdivided into eight germination trays of 25 seeds each, arranged in paper moistened with 2.5 liters of distilled water.

The trays were all kept in roll form and packed in transparent plastic packages, in order to avoid the loss of moisture. They were placed in the germination chamber, with a constant temperature of 20ºC (BRASIL, 2009).

Evaluations were performed on the fourth and twenty-first days, determining how many normal seedlings germinated, with well-formed primary roots and expanded shoots (figure 1). The results were expressed as percentage of normal seedlings (BRASIL, 2009).

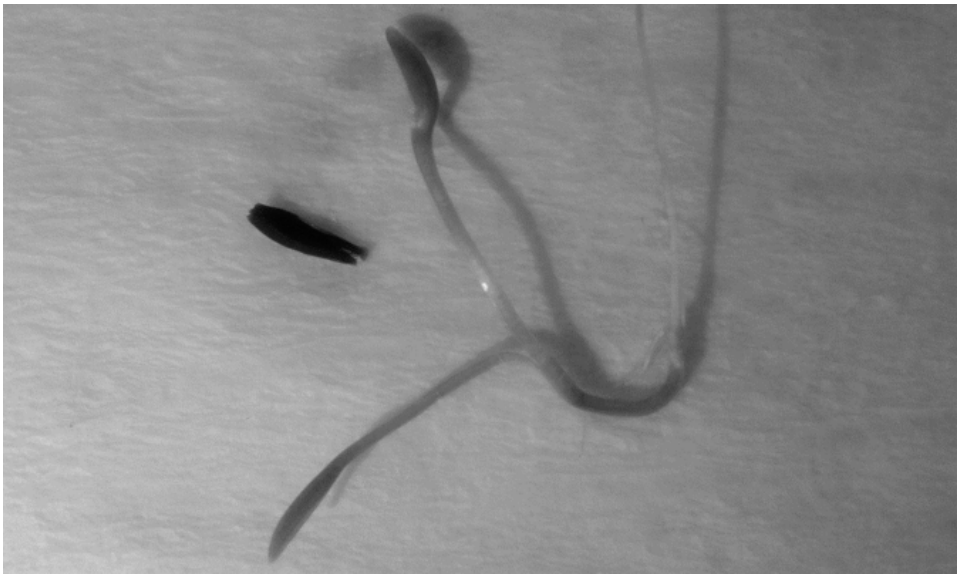

Figure 1 – *Dahlia pinnata* Cav. seedling in the germination test reading.

In the experimental field, sowing was carried out in plastic containers with a capacity of 300 ml, drilled in the bottom for irrigation water drainage.

The substrate used for the formation of the seedlings was a mixture of black earth plus sand, sieved for the exclusion of impurities.

The sown materials were arranged into two cultivation environments, with ten replications, and the environments consisted of: greenhouse with 50% shading (Sombrite®) and full sun, both with daily irrigation.

For plant growth analysis, growth assessment was performed from the seventh day after emergence, every seven days, by mean of weekly measurements of height, from the soil level to the apex of the plant, with the help of a graduated ruler.

The number of emerged plants, from the first week after sowing until the establishment of the seedlings, was evaluated. Plants with the first expanded leaflets were determined as emerged.

The results were submitted to analysis of variance by the Tukey test at 5% and also to the regression analysis for the analysis of plant growth. For the statistical calculations, the Sisvar software was used (FERREIRA, 2011).

RESULTS AND DISCUSSION

Evaluating the germination potential of commercial seeds used in the research, it was found that this is significantly below the information passed on to the consumer.

The germination test showed 71% of normal seedling germination, in contrast to the minimum germination information of 93% described on the package

This information becomes important as the producer who uses commercial seed expects reliable information and often attributes unsuccessful production to the sowing process or early care.

According to Mapa (2005), guaranteeing the minimum germination standard or, where appropriate, viability, will be the responsibility of the seed producer.

Seed propagation has advantages such as low cost, easy transportation and storage.

However, ornamental plant seed production is still ineffective, as it brings problems such as limited germination power, poor information on seed germinability, plant types different than the expected and loss of the original plant type.

In greenhouse cultivation with Sombrite® (50%), whose average temperature was 34.3°C, there was emergence and establishment of 32% of the seedlings under evaluation and satisfactory growth, when submitted to growth analysis (figure 2).

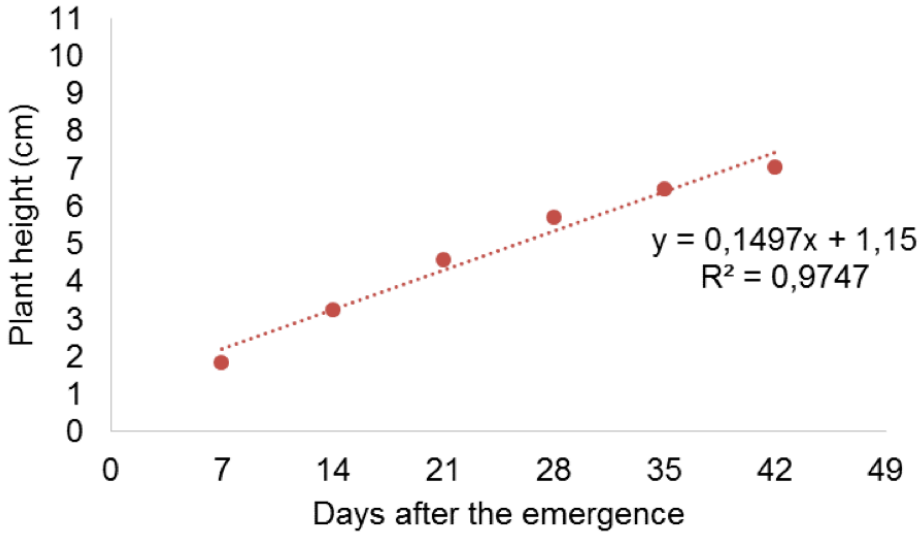

Figure 2 – Growth analysis of *Dahlia pinnata* seedlings in greenhouse.

However, in the production of seedlings in full sun cultivation, there was no emergence of plants.

The emergence and production of seedlings may have been influenced directly by the low germination potential of the seeds of *Dahlia pinnata*, altogether with the temperature factor and irradiation.

The study of the local temperature is imperative to meet the growing demand for flower consumption.

It is essential to encourage producers, associations and cooperatives to seek information on appropriate techniques.

This set of factors affects end product quality and causes inaccuracy in production costs.

Brondum & Heins (1993) state that the negative effects of temperature on growth rates and morphological development of *Dahlia pinnata* Cav. are observed in cultures with temperatures above 20°C, a fact common to the study region.

Mariña (2015) reports that dahlias are plants that grow in full sun but he also states that they can be found in shady environments, usually at temperatures of 23°C.

According to Resende *et al.* (2011), the shaded environment provides better performance to plants due to the lower temperature, the reduced evaporation, which favors increased water availability and, consequently, a better plant development.

For the evaluated conditions, it is possible to produce *Dahlia pinnata* Cav. seedlings in environments with adequate shading, even at higher temperatures, provided that there is local suitability (temperature and shading) and use of seeds with high germination potential.

The success of producing seedlings for floricultural landscaping lies in safe source of materials, local studies and available technologies.

This may be a new opportunity for producers seeking diversification of crops, as floriculture is a highly profitable activity and may not depend on large distribution centers.

CONCLUSION

- In the municipality of Varzea Grande, State of Mato Grosso, environments of cultivation with Sombrite® (50%), allow the cultivation of flower seedlings of the species *Dahlia pinnata*;
- Commercial seeds presented low germinative potential;
- Temperatures above 36°C inhibited the formation of seedlings.

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